

# Introduction of Early Clinical Exposure (ECE) in Anatomy for Medical Students & its Implications

Shveta Swami<sup>1</sup>, Virendra Buddhiraja<sup>1</sup>, Deepak Sharma<sup>2</sup>

<sup>1</sup>Department of Anatomy, Kalpana Chawla Govt. Medical College, Karnal, Haryana, India

<sup>2</sup>Consultant, Department of Pediatric and Preventive Dentistry, Park hospital, Karnal, Haryana, India

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## ABSTRACT

**Introduction:** early clinical exposure (ECE) recognizes the relevance of basic sciences in a clinical context. Thus, the present study is being done to introduce & implement ECE in first year M.B.B.S. students (Batch 2019 - 2020) and to obtain feedback from faculty & students.

**Methods:** the project was conducted on 120 students of phase 1 M.B.B.S. in Dept of Anatomy, Kalpana Chawla Govt. Medical College, Karnal. A series of four ECEs were conducted on clinically relevant topics from the subject of Anatomy: carpal tunnel syndrome, osteoarthritis, pleural effusion & Bell's palsy. A semi structured pre validated questionnaire on Likert scale was designed for the anonymous feedback of M.B.B.S. phase 1 students. The feedback of faculties was taken by semi-structured interviews.

**Results:** four ECE modules were developed after this project. All the students agreed that ECE has increased their familiarity with the role of Anatomy in clinical settings. 95 percent students (strongly agree plus agree) believed that ECE has created interest in Anatomy. 92% agreed that ECE helped them in better retention of topics than traditional lecture classes. 91% students (Strongly agree & agree) were motivated to participate & study more on that specific topic.

**Conclusion:** ECE has led to better understanding, retention & performance of the students. But most of the students suggested that ECE sessions should preferably be conducted in hospital settings & there should be real student patient interactions.

**Keywords:** Early clinical exposure; First phase Medical students; Traditional teaching; Clinical context.

## Introduction

Early years of undergraduate education (especially the first two years) are critical for the academic success of medical students. Such success depends not only on the expanding knowledge learned during these years, but also on pre-conceived attitudes towards medicine and the role of the physician<sup>1</sup>.

In the traditional curricula of medical education, students learn theoretical knowledge without contact with the patient in a clinical context. Moreover, in clinical fields they cannot recall important basic scientific concepts; therefore, parts of their academic education become impractical<sup>1,2</sup>.

Various approaches have been introduced to find new ways of didactic instructions in order to improve teaching basic sciences and make it more practical<sup>1,3,4</sup>.

ECE is defined as "authentic human contact in a social or clinical context that enhances learning of health, illness and/ or disease, and the role of the health professional", occurring in the early or preclinical years of undergraduate education.

The ECE program in the MBBS curriculum tries to create an opportunity for students to correlate learning in Phase I subjects with their clinical application. This can improve student's motivation to learn and also

improve retention. It also provides authentic human context and early introduction to immersion into the clinical environment. ECE enriches and contextualizes learning for the students. The key principles underlying early clinical exposure are providing a clinical context and ensuring patient centricity. The clinical context can include case scenario, videos, actual patient, simulated patient etc. The presence of actual patients in every session of ECE, though not essential, is preferred. Therefore, ECE is exposure to the relevant clinical context in earlier years<sup>6</sup>.

Early experience motivated and satisfied students of the health professions and helped them acclimatize to clinical environments, develop professionally, interact with patients with more confidence and less stress, develop self-reflection and appraisal skill, and develop a professional identity. It helped students learn about the structure and function of the healthcare system, and about preventive care and the role of health professionals. There were outcomes for beneficiaries other than students, including teachers, patients, populations, organizations and specialties<sup>7</sup>. Thus, ECE boosts their confidence in their ability to succeed in medical practice & their social, emotional, professional satisfaction & problems<sup>8</sup>.

Michelle has stated in his study that like many other medical education bodies, the Health Professions Council of South Africa has advocated changes in the education and training of medical practitioners. The suggested reform includes early clinical exposure in a range of settings. Early in the design of Curriculum 2001, a problem-based learning programme, health care visits in Year 1 were considered essential. The decision of curriculum organisers to introduce students to patients in Year 1 of the new PBL (Problem Based Learning) curriculum was well received<sup>9</sup>.

Thus, the present study is being done to introduce & implement ECE in first year M.B.B.S. students, as now it is also the part of new curriculum for phase 1 M.B.B.S students (Batch 2019-2020) as per MCI guidelines on Early Clinical Exposure (ECE) For Undergraduate Medical Education Program, 2019, CISP Module 2 ECE<sup>5</sup>. The aim of the study is to introduce ECE for undergraduate students in Anatomy & to study the perceptions of phase 1 medical students & faculties regarding effectiveness of ECE in correlating knowledge learnt in Anatomy with clinical sciences. The other objectives are:

1. To train the core faculty regarding ECE.
2. To design ECE modules for the study.
3. To implement ECE modules in first phase M.B.B.S students for the learning of Anatomy.
4. To obtain feedback from faculty (through interviews) & students (questionnaires).

## Material and Method

Study site: Dept of Anatomy, Kalpana Chawla Govt. Medical College, Karnal.  
 Study participants: 120 Phase 1 M.B.B.S. students who consented to participate in project & Teachers/Faculty conducting ECE  
 Study period: Six months.

### Process:

- The project was conducted in Dept of Anatomy, Kalpana Chawla Govt. Medical College, Karnal. 120 students of phase 1 M.B.B.S. & faculty involved in conducting ECE participated in the study.

- Informed consent was obtained from the participants (Annexure 1).

- The project was exempted from Institutional Ethical Committee Clearance as it was a part of normal training schedule of M.B.B.S. studies & there was no bio-medical research on human or medicines or medical device. (Annexure 4)

- First of all, a one day workshop was conducted in the dept. of Anatomy for training the core faculty involved in ECE according to the guidelines given by MCI for conducting ECE for undergraduate medical UG program (2019) CISP Module 2<sup>5</sup>.

- An orientation session for the students was conducted prior to the start of study wherein the objectives of the program, clear directives regarding

the conduct of sessions & the expected goals of ECE were highlighted as per guidelines given by MCI for conducting ECE for undergraduate medical UG program (2019) CISP Module 2<sup>5</sup>.

- A series of four ECEs (each of 3 hours duration) on clinically relevant topics were conducted from subject of Anatomy as follows :

1. Carpal tunnel syndrome: Paper based case was discussed with all the signs/symptoms of the syndrome (with role plays) in classroom setting.

2. Osteoarthritis: Paper based case discussion with role plays & a patient was brought with X-ray findings in the classroom setting.

3. Pleural effusion: Hospital setting ECE with student-patient interaction, demonstration of signs, symptoms & radiographs to the students.

4. Bell's palsy: Classroom setting with a paper based case discussion & a video recording of the actual patient who visited the OPD showing all the sign/symptoms of Bell's Palsy.

The hospital setting ECE was coordinated by the faculty of the clinical department. The students were provided with proper observation guides in the ECE conducted in hospital settings & when they interacted with the patient in the class.

- Thus, four modules of ECE were prepared as per the guidelines of MCI by the faculty of pre clinical & clinical departments. Selection of above topics was done with an intention to expose the students to a variety of learning experiences involving all the three domains of learning - cognitive, psychomotor and affective. The learning objectives for each session were chosen carefully in view of student's prior knowledge, the availability of clinical material and relevance. Based on the learning objectives, assignments were formulated for all the sessions.

- Three ECEs were done in classroom settings with the help of paper cases, role plays, videos, patient brought to the classroom & one was conducted in the hospital setting as mentioned above. All the modules thus prepared by the faculty were pre-validated by the whole faculty of Anatomy Dept, relevant clinical departments as well as by the MEU coordinator.

- A semi structured pre validated questionnaire on Likert scale (Annexure 2 ) was designed for the anonymous feedback of M.B.B.S. phase 1 students & was given to them (self administered) after the sessions of ECE.

- The feedback of faculties was taken by semi-structured interviews (Annexure 3) of 10 faculty members ( six faculty from Anatomy Dept, two were from Medicine Dept & two were from orthopaedics dept) involved in conducting ECE sessions. All the comments of the interviewer's were recorded & summarised at the end of the interview and the respondent was asked if the summary is correct.

- Data was compiled & analysed using Microsoft office Excel, 2017.

### Results

120 students of phase 1 participated in the study after giving the informed consent for the study. One day workshop was conducted to train the core faculty involved in conducting ECE. Four pre-validated ECE modules were designed & implemented for the study. The feedback from students (N=120) was recorded on the duly filled feedback questionnaire forms on Likert scale (shown in table 1 and figures 1,2,3) & feedback from faculty (N=10) was recorded from the semi-structured interviews. The data was recorded & analysed using Microsoft excel , 2017

The following are the results (Table1) obtained from the feedback questionnaire (Annexure 2) given to the students:

- All the students agreed that ECE has increased their familiarity with the role of Anatomy in clinical settings.
- 95 percent students (Strongly agree & Agree) believed that ECE has created interest in Anatomy.
- All could understand the topics better by incorporation of ECE along with regular lectures.
- > 92% agreed that ECE helped them in better retention of topics than traditional lecture classes.

Table 1. Student’s feedback on Likert scale

S No	Items	Strongly agree 5	Agree 4	Neutral 3	Disagree 2	Strongly disagree 1
1.	ECE increased my familiarity with the role of Anatomy in clinical settings	50(42%)	70(58%)	0	0	0
2	ECE created my interest in the subject	62(52%)	52(43%)	6(5%)	0	0
3.	I could understand the topics better by incorporation of ECE along with regular lectures.	61(51%)	59(49%)	0	0	0
4.	ECE helped me in better retention of topics than traditional lecture classes	64(53%)	46(38%)	10(8%)	0	0
5.	I was motivated to participate & study more on that specific topic.	58(48%)	51(42.5)	11(9%)	0	0
6.	I was provided with opportunities to discuss & share knowledge in ECE sessions	67(56%)	48(40%)	5(4%)	0	0
7.	ECE will help me in life long learning of the topics	46(38%)	64(53%)	10(8%)	0	0
8.	More topics should be taught with this intervention	71(59%)	49(41%)	0	0	0

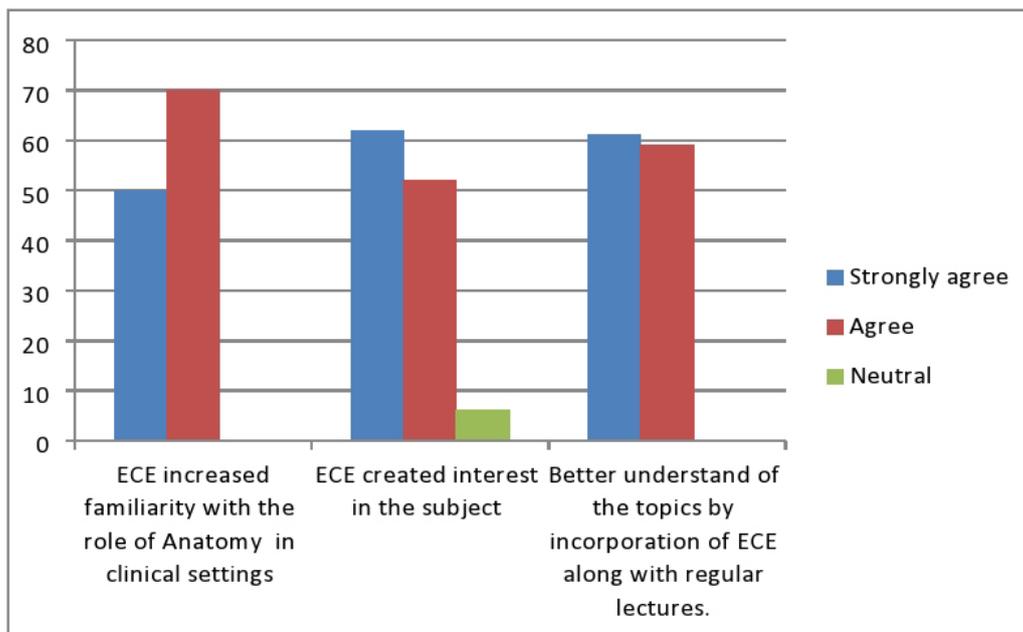


Figure 1. Feedback from students (N=120) for questions 1, 2, 3 (Annexure 2)

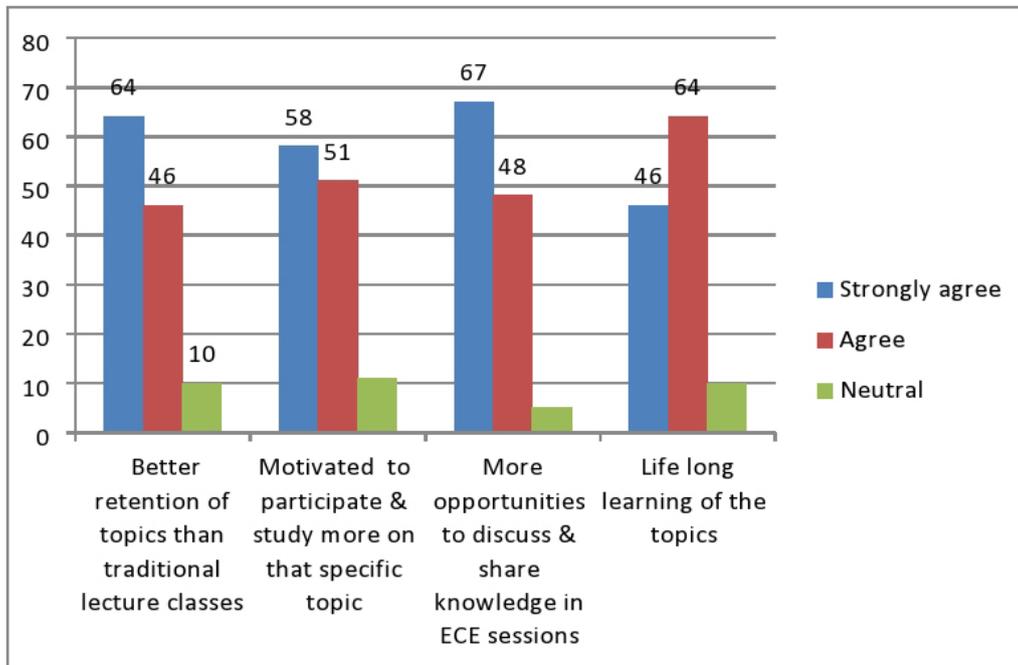


Figure 2. Feedback from students (N=120) for questions 4,5,6,7 (Annexure 2)

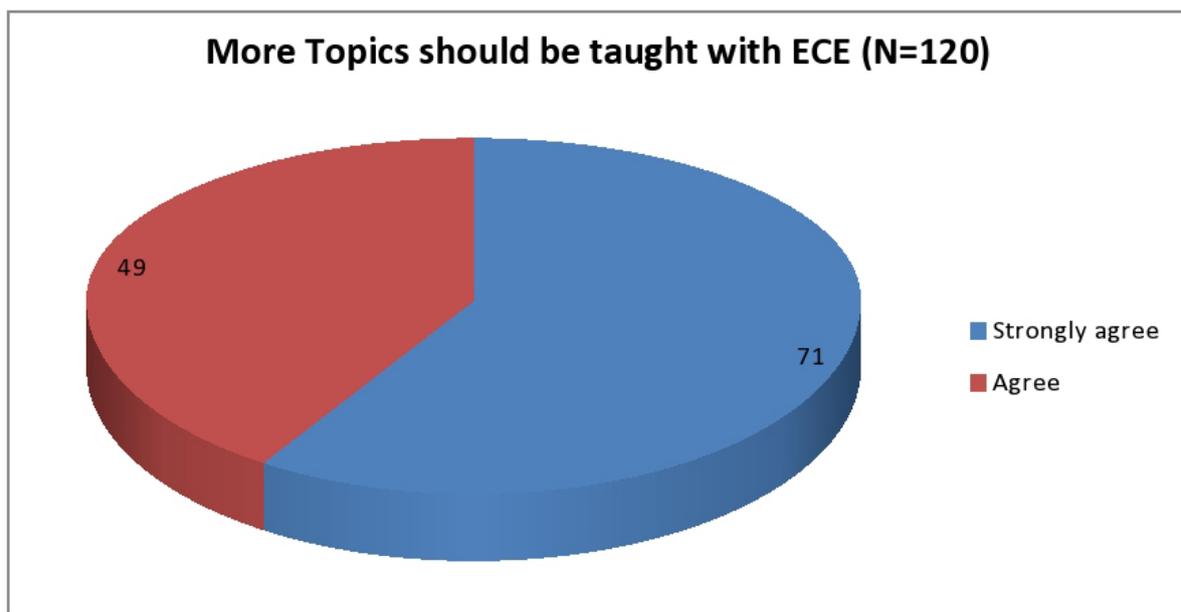


Figure 3. Feedback from students (N=120) for question 8 (Annexure 2)

> 91% students (Strongly agree & Agree ) were motivated to participate & study more on that specific topic.

> 96% students agreed that they were provided with opportunities to discuss & share knowledge in ECE sessions.

> 92% agreed that ECE will help them in life long learning of the topics.

> All agreed that more topics should be taught with this intervention.

**Typical student’s suggestions for improving ECE**

**(Feedback Questionnaire question no 9) (Annexure 2)**

The most common comments of the students to this question were as follows:

- Interactions with patients & hospital visits should be preferred in ECE sessions as compared to paper based cases.
- More time should be given to ECE sessions in the curriculum.
- Smaller groups should be formed while conducting ECE sessions.
- ECE sessions should be more & more integrated with other subjects.

### Semi-structured interview of teachers/faculty involved in ECE (Number of faculty, N=10) (Annexure 3)

A semi-structured interview was conducted with 10 faculty members ( six faculty from Anatomy Dept, two from Medicine Dept & two from orthopaedics dept) involved in conducting ECE sessions. All the comments of the interviewer's were recorded & summarised at the end of the interview (Figure 4) and the respondent was asked if the summary is correct.

The following observations were made from the interviews:

- Links basic sciences to clinical aspects
- Enhances students ability to correlate subject of Anatomy with clinical skills
  - > Four of them were of the opinion that teachers/faculty are also in touch with clinical knowledge. (4/10)
  - > Three of them found that the students were getting the feeling of becoming doctors from first year. (3/10)
  - > Two of them stated that interactive learning sessions generates more interest & in depth

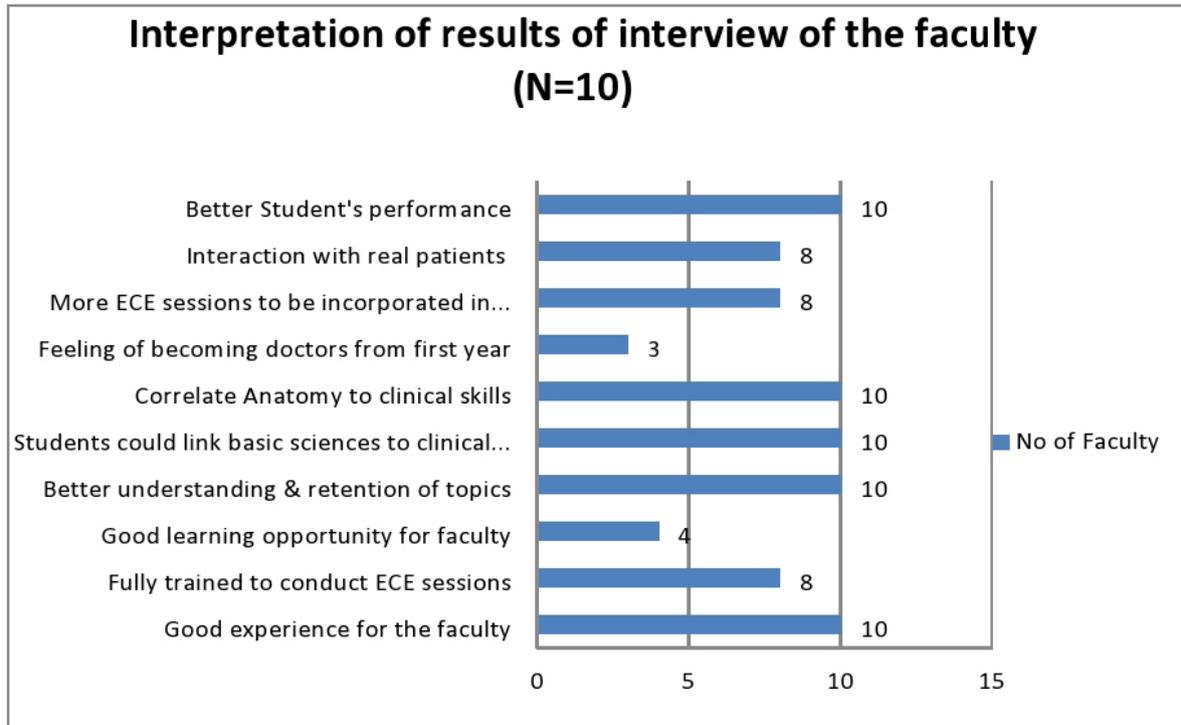


Figure 4. Faculty Feedback (N=10) (Annexure 3)

### Q1. How was your experience of conducting ECE sessions?

> All the faculty participants shared that ECE was a good experience as special emphasis is laid on clinical significance which made the difference. The students were more receptive. (10/10)

> Most of them (8/10) expressed their opinion that after the workshop on ECE & after conducting the ECE sessions, now they are fully trained to conduct the ECE sessions for future batches.

> Four of them stated that it was a good learning opportunity for the faculty also. (4/10)

> Some time constraints were opined by the faculty of the clinical departments. (2/10)

### Q2. What are the strengths/benefits of conducting ECE sessions?

> All the participants were of the opinion (10/10) that ECE leads to

- Better understanding & retention of topics by the students

knowledge of a particular topic. (2/10)

### Q3. Mention the limitations or the challenges faced by you while conducting these sessions? (Figure 5)

> All the participants stated that shortage of faculty (student teacher ratio) both in preclinical & clinical departments limits ECE sessions to classrooms only. Because of that it is not possible to conduct ECE sessions in small groups. (10/10)

> Lack of coordination between class & OPD timings.

> Two of them reported limited interactions from student's side during ECE sessions (2/10).

### Q4. How was the response of the students to ECE sessions?

> Most of the faculty members (8/10) were of the opinion that

1. Students felt interested & expressed desire to learn about the topics

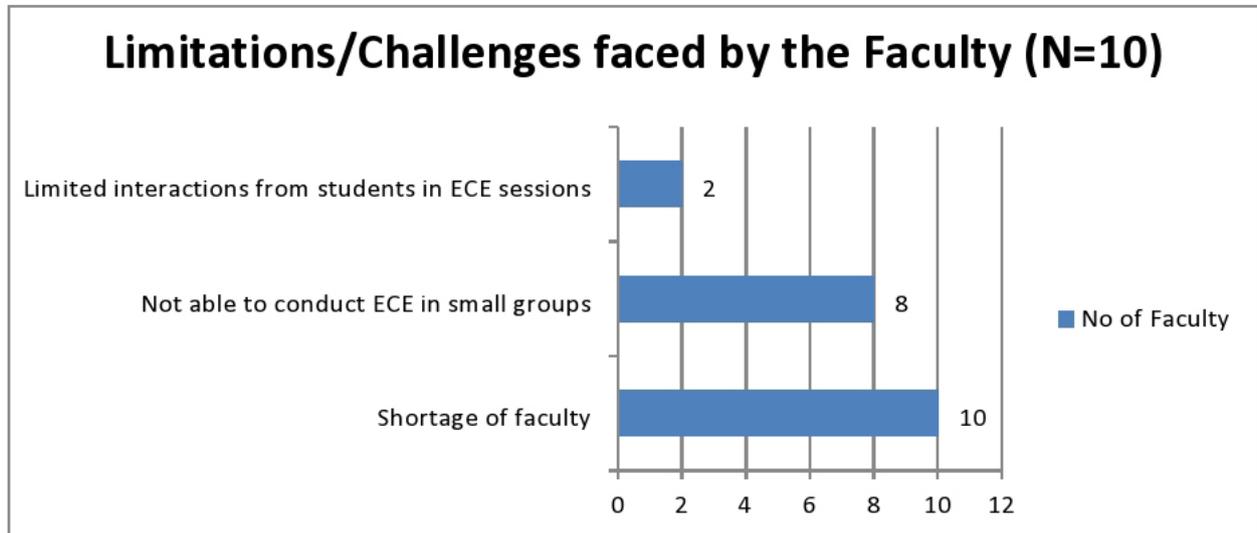


Figure 5. Faculty Feedback (Annexure 3)

2. Overwhelming response to hospital visits
3. More ECE sessions to be incorporated in the curriculum
  - > Students pointed out that interaction with real patient will be more beneficial & memorable. (8/10)

**Q5. Does it helped in improving the understanding & the performance of the students?**

- > All the faculty agreed that that ECE has improved the understanding & performance of student. (10/10)
- > Two of them stated that it was a very interesting way in which students observe, learn, discuss & reflect about a particular topic. (2/10)
- > Two of participants stated clinical correlation helps in long term retention. (2/10)
- > In the assessment of students based on Clinical case scenario based questions, performance was very good as the students have developed the logical reasoning skills. (3/10)

**Discussion**

The present study is being done to introduce & implement ECE in first year M.B.B.S. students, as now it is also the part of new curriculum for phase 1 M.B.B.S students (Batch 2019-2020) as per MCI guidelines on Early Clinical Exposure (ECE) For Undergraduate Medical Education Program, 2019, CISP Module 2 ECE<sup>5</sup>. This study aimed to determine the outcomes of the project entitled "Introduction of Early Clinical Exposure (ECE) in Anatomy for medical students".

In the present study, all the students agreed that the ECE increased their familiarity with the role of Anatomy in clinical settings & has led to better understanding of the topics. 95-96% students (Strongly agree & Agree) believed that ECE has created interest in Anatomy & provided with opportunities to discuss & share knowledge in ECE sessions. 91-92% agreed that

ECE helped them in better retention of topics & also motivated them to participate & study more on that specific topic.

In the present study, all the faculty members expressed their experience of conducting ECE to be good which has led to better understanding in students & also enhances the student's ability to correlate with clinical knowledge. Most of the faculty opined that the performance of students has improved after the introduction of ECE. Most of the faculty has stated about the overwhelming response of the students to ECE & has agreed for conducting more & more of sessions of ECE in first phase. The only challenge being faced by them was the shortage of faculty & hence the inability to carry out ECE in small groups. After the study, the faculty has opined that they are now fully trained to conduct the ECE sessions for the successive batches. Four ECE modules were developed as a result of the present study.

The results of the present study are in concordance with the following studies Surekha *et al*<sup>10</sup>, Sheshgiri (2017) & Ebrahimi (2007).

Surekha *et al.* in 2018 studied the perceptions of first year medical students towards ECE & demonstrated that students enjoyed the experience of early clinical exposure and it motivated the learning process. ECE can be an important and efficient factor in improving the motivation and can be of great help in the recall of knowledge in medical students. Preclinical students received different benefits from the different experiences. A combination of experiences may help students to achieve best clinical knowledge, clinical skills, and understanding the basic of medical profession and broad exposure for career decisions<sup>10</sup>.

Tayade *et al* (2014) found early clinical exposure was better learning methodology than traditional teaching for medical students in Indian Scenario. However it was also noted that faculties believed that ECE consumes more manpower, infrastructure, time and

requires extra efforts on their part. Faculty also raised concern over coordination with clinical department. All faculties agreed that some level of training may be required<sup>11</sup>.

Ramachandran *et al* (2015) studied the responses of the study group on traditional gross anatomy lectures (TGL) and innovative interactive clinical anatomy lectures (ICALs) on their learning and understanding of the clinical conditions were collected using the nominal group technique. He showed that ICALs are effective in correlating anatomical and clinical information to students. The nominal group technique responses of the study group showed that they appreciated it as a better method of teaching and learning<sup>12</sup>.

Johnson & Scotts have shown in their study that early clinical experience may contribute to students' satisfaction with medical education<sup>13</sup>.

Ebrahimi in a study on 2007 students concluded that early clinical experience parallel with theoretical courses can provide a framework for the beneficial and successful integration of the teaching and learning of basic sciences for medical students<sup>14</sup>.

Sheshgiri (2017) in his study provided evidence on the effect of video presentations of common clinical cases during the anatomy classes in terms of comprehension and correlation.

The video demonstration of common clinical cases as an adjuvant to didactic lectures has made a positive impact in the form of increase in knowledge<sup>15</sup>.

Certain limitations of the study are as follows:

1. Less manpower or shortage of faculty (both in preclinical & clinical departments) to conduct the ECE sessions effectively. As a result, it was difficult to conduct the sessions in small groups.

2. Difficulty in conducting hospital setting ECEs due lack of coordination between the class timings & OPD timings.

## Conclusions

The following conclusions can be drawn from the study:

> The students were more motivated, interested & satisfied in learning Anatomy with the incorporation of ECE into the curriculum.

> ECE has led to better understanding, retention & performance of the students.

> It was a good experience for the faculty to conduct the ECE sessions in terms of student teacher interaction & their own learning experience. The faculty was also fully trained after the sensitization workshop & conduction of ECE sessions.

> Four ECE modules were developed as a result of present study.

> To conduct ECE sessions in a more effective manner, the preclinical & clinical Depts should be given more faculty.

As the results of the project were positive & encouraging, more & more students have been found to be motivated, interested & satisfied with ECE, teachers have been trained in ECE, hence more & more topics can be taught through ECE in Anatomy as it will improve the understanding & performance of the students. As suggested by most of the students, ECE sessions should preferably be conducted in hospital settings & there should be real student patient interactions.

## Acknowledgement

I am extremely thankful to all the students of phase 1 M.B.B.S (Batch 2019-2020, Faculty of Anatomy Dept., Orthopedics & Medicine Dept for their support. I am also thankful to the MEU coordinator of my college as well as the whole ACME Faculty, CMC Ludhiana for their continuous support & guidance support & guidance.

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## Annexures

### Annexure 1

KALPANA CHAWLA GOVT MEDICAL COLLEGE&HOSPITAL, KARNAL

Informed Consent Form

I hereby give my consent voluntarily to participate as a subject in the project entitled "Introduction of Early Clinical Exposure (ECE) in Anatomy for medical students."

The whole study & its procedure has been well explained (in the language I can best understand). I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction.

Signature of the Investigator:

Name of the Investigator:

Date:

Signature of the Participant:

Name of the participant:

Fathers Name:

Phone no:

Date:

### Annexure 2

Feedback Questionnaire for students on Likert Scale

Title: Introduction of Early Clinical Exposure (ECE) in Anatomy for medical students

Student feedback questionnaire

Dear Participants

The purpose of this activity to get the feedback of the students on Early Clinical Exposure (ECE) for evaluation & improvement of the sessions. Kindly fill up the forms & return it to me.

S No	Items	Strongly agree 5	Agree 4	Neutral 3	Disagree 2	Strongly disagree 1
1.	ECE increased my familiarity with the role of Anatomy in clinical settings					
2	ECE created my interest in the subject					
3.	I could understand the topics better by incorporation of ECE along with regular lectures.					
4.	ECE helped me in better retention of topics than traditional lecture classes					
5.	I was motivated to participate & study more on that specific topic.					
6.	I was provided with opportunities to discuss & share knowledge in ECE sessions					
7.	ECE will help me in life long learning of the topics					
8.	More topics should be taught with this intervention					
9.	Give your suggestions for the improvement of ECE sessions.					

**Annexure 3**

Questionnaire for semi-structured interview of teachers/faculty involved in ECE

- Q1. How was your experience of conducting ECE sessions?
- Q2. What are the strengths/benefits of conducting ECE sessions?
- Q3. Mention the limitations or the challenges faced by you while conducting these sessions?
- Q4. How was the response of the students to ECE sessions?
- Q5. Does it helped in improving the understanding & the performance of the students?

**Annexure 4**

**DIRECTOR**  
**KALPANA CHAWLA GOVT. MEDICAL COLLEGE, KARNAL**  
Telephone No. & Fax No. 0184-2266252, Website: www.kcgmc.edu.in  
Email: kcgmcarnal13@gmail.com



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Memo No.: KCGMC/Estt./GA-1/2019/ 9914      Dated: 30-10-2019

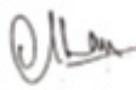
To  
Dr. Shveta Swami, Associate Professor (Anatomy),  
KCGMC, Karnal.

**Subject: - Regarding ethical clearance of research project proposal for advanced course in Medical Education (ACME).**

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With reference to your application No. KCGMC/Anat/2019/239 dated 01.10.2019, on the subject noted above.

I have been directed by the competent authority to intimate you that the study intended to be conducted by you is a part of normal training schedule of MBBS studies and there is no bio-medical research on human or medicines or medical devices is proposed in the study. Therefore, the project proposed by you is hereby exempted from Institutional ethical committee clearance as requested by you in the interest of this Institute. You may proceed with the project as proposal.

  
Superintendent  
For Director, Kalpana Chawla Govt. Medical College,  
Karnal  
Dated : 

Endst. No. KCGMC/Estt./GA-1/2019/  
A copy of the above is forwarded to Dr. Jayant Kumar Kari, Member Secretary,  
Ethics Committee, KCGMC, Karnal.

  
Superintendent  
For Director, Kalpana Chawla Govt. Medical College,  
Karnal

### Mini Curriculum and Author's Contribution

1. Shveta Swami, MBBS; MS: Contribution: Effective scientific & intellectual participation for the study, technical procedures, data requisition, data interpretation, preparation & draft of manuscript, critical review & final approval. Orcid Id:0000-0002-1074-3305.
2. Virendra Budhiraja, MBBS; MD: Contribution : preparation & draft of manuscript, critical review & final approval.
3. Deepak Sharma BDS, MDS: Contribution : preparation & draft of manuscript, critical review & final approval. Orcid Id: 0000-0002-7226-9143.

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Corresponding author  
Shveta Swami  
Email: shveta\_swami@rediffmail.com